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Metal Industry Indicators

Indicators of Domestic Primary Metals, Steel, Aluminum, and Copper Activity

March 2011

The primary metals leading index continues to show strength, rebounding in February. Its 6-month smoothed growth rate rose moderately in February. The U.S. recovery appears strong enough to support a modest metals demand, but it is the infrastructure rebuilding from the earthquake in Japan that is likely to generate a major metals demand in the near future. The metals price leading index increased in January, and its growth rate continued to move higher, pointing to continued metals price growth in the near term.

The **primary metals leading index** increased 1.5% in February to 158.7 from a revised 156.3 in January. The index's 6-month smoothed growth rate, a compound annual rate that measures the near-term trend increased to 12.2% from a revised 10.5% in January. A growth rate above +1.0% is usually a sign of an upward near-term trend for future metals activity, while a growth rate below -1.0% indicates a downward trend. For an explanation of these indexes and a definition of the primary metals industry, see page 10.

All of the index's four available components increased in February. A rebound in the length of the average workweek in primary metals establishments made the largest contribution, 0.6 percentage points, to the overall increase in the leading index. The stock price index combining construction and farm machinery companies and industrial machinery companies continued to rise in February and contributed 0.5 percentage points. The USGS metals price index growth rate increased for the third consecutive month, contributing 0.2 percentage points. The Institute for Supply Management's PMI set a new current high in February and added another 0.1 percentage point to the leading index. It is well above the threshold that denotes an increase in future manufacturing activity. The primary metals leading index will likely be revised next month when the remaining four components become available.

The high primary metals leading index growth rate indicates that the recovery in the U.S. primary metals industry will likely continue in the near term. Although the U.S. construction sector remains suppressed, the manufacturing sector is positive enough to generate, at least moderate domestic metals consumption. The rebuilding from the earthquake in Japan will further underpin metals demand, despite concerns over a global economic slowdown stemming from the turmoil in the Middle East and North Africa.

The **steel leading index** registered 0.4% lower in January, the latest month for which it is available, moving to 112.9 from a revised 113.3 in December. Its 6-month smoothed growth rate slipped to 6.3% from a revised 8.0% in December. A pullback in average weekly hours in iron and steel plants and a drop in the index for new housing permits issued made the largest negative contributions to the leading index in January. While six of its nine indicators posted gains in January, several contributions were relatively small. Nevertheless, the rising steel scrap price growth rate and the S&P stock price index for steel companies buoyed the steel leading index some in January. The high steel leading index growth rate is indicating that U.S. steel industry activity is likely to continue to be strong in the near term.

The **copper leading index** declined 1.1% in January to 121.1 from a revised 122.5 in December. Its 6-month smoothed growth rate decreased, slipping to 0.5% from a revised 2.5%, in December. Similar to the steel leading index, fewer weekly hours in nonferrous metal products except aluminum plants and a lower index for new housing permits issued pulled the leading index down the most in January. The rising S&P stock price index for building products companies made the only sizable positive contribution to the leading index. The still positive copper leading index growth rate and the high demand for copper suggest that the recovery in the U.S. copper industry will likely continue in the near term.

Metals Price Leading Index Points to Higher Prices

The **metals price leading index** increased 0.7% to 108.3 in January, the latest month for which it is available, from a revised 107.6 in December, and its 6-month smoothed growth rate rose to -2.6% from a revised -5.4% in December. A rebound in the growth rate of the trade-weighted average exchange value of other major currencies against the U.S. dollar made the largest positive contribution, 0.4 percentage points, to the net increase in the leading index. The growth rate of the Organization for Economic Cooperation and Development (OECD) Total Leading

Index, which had been on a downward trend for a year, appeared to be picking up recently. It contributed 0.2 percentage points to the leading index in January. The widening yield spread between the U.S. 10-year Treasury note and the federal funds rate contributed 0.1 percentage point. In contrast, the contribution from a step down in the growth rate of the inflation-adjusted value of new orders for U.S. nonferrous metal products rounded to zero. The metals price leading index signals major changes in the growth rate of nonferrous metals prices an average of 8 months in advance.

The growth rate of the inflation-adjusted value of U.S. nonferrous metal products inventories, which is an indicator of supply, decreased in January. Relatively low inventories and the rising metals price leading index growth rate suggest continued metals price growth, however, unrest in the Middle East and North Africa threatens to slow global economic growth. On the other hand, metals consumption for the rebuilding efforts from the earthquake in Japan may outpace current metals supplies, thus boosting metals price growth in the near term.

The business cycle, inventories, and geopolitical instability are only three factors in metal price determination. Other factors that affect prices include changes in metals production, strategic stockpiling, foreign exchange rates, speculation, and production costs.

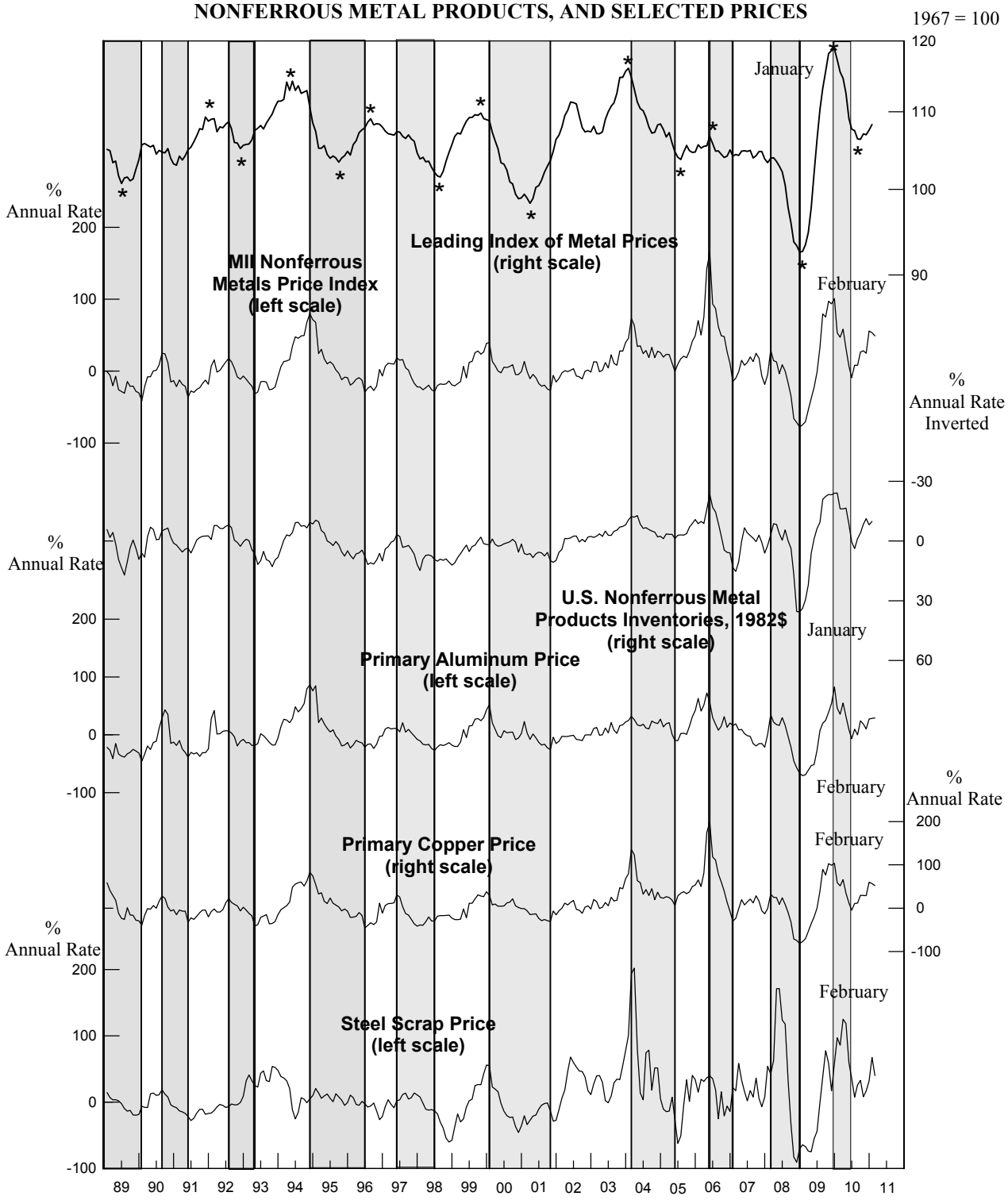
Table 1.
Leading Index of Metal Prices and Growth Rates of the Nonferrous Metals Price Index, Inventories of Nonferrous Metal Products, and Selected Metal Prices

		Six-Month Smoothed Growth Rates				
	Leading Index of Metal Prices (1967=100)	MII Nonferrous Metals Price Index	U.S. Nonferrous Metal Products Inventories (1982$)	Primary Aluminum	Primary Copper	Steel Scrap
2010						
January	117.2	53.2	-24.1	46.2	59.0	96.9
February	115.5r	46.9	-16.1	35.3	51.7	85.8
March	114.6r	58.2	-16.2	55.0	66.0	125.1
April	112.5	31.5	-16.5	31.7	34.6	118.1
May	109.1r	6.9	-8.4	9.0	12.3	59.6
June	107.7r	-9.2	0.5	-6.7	-4.7	35.7
July	107.5	8.2	3.8	9.6	10.8	7.3
August	106.4r	7.9	-1.1	-0.1	11.9	25.7
September	106.3r	26.5	-4.1r	24.0	29.8	32.6
October	107.1r	28.4	-8.4r	18.6	29.4	8.1
November	106.9r	24.8	-11.2r	10.1	29.1	16.8
December	107.6r	55.8	-8.2r	27.2	60.1	32.0
2011						
January	108.3	53.4	9.8	28.4	57.0	67.3
February	NA	48.9	NA	29.2	52.3	39.9

NA: Not available **r:** Revised

Note: The components of the Leading Index of Metal Prices are the spread between the U.S. 10-year Treasury Note and the federal funds rate, and the 6-month smoothed growth rates of the deflated value of new orders for nonferrous metal products, the Organization for Economic Cooperation and Development (OECD) Total Leading Index, and the reciprocal of the trade-weighted average exchange value of the U.S. dollar against other major currencies. The Metal Industry Indicators (MII) Nonferrous Metals Price Index measures changes in end-of-the-month prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange (LME). The steel scrap price used is the price of No. 1 heavy melting. Inventories consist of the deflated value of finished goods, work in progress, and raw materials for U.S.-produced nonferrous metal products (NAICS 3313, 3314, & 335929). Six-month smoothed growth rates are based on the ratio of the current month's index or price to its average over the preceding 12 months, expressed at a compound annual rate.
Sources: U.S. Geological Survey (USGS); American Metal Market (AMM); the London Metal Exchange (LME); U.S. Census Bureau; the Organization for Economic Cooperation and Development (OECD); and Federal Reserve Board.

CHART 1.
LEADING INDEX OF METAL PRICES AND GROWTH RATES OF NONFERROUS METALS PRICE INDEX, INVENTORIES OF NONFERROUS METAL PRODUCTS, AND SELECTED PRICES



Shaded areas are downturns in the nonferrous metals price index growth rate. Asterisks (*) are peaks and troughs in the economic activity reflected by the leading index of metal prices. Scale for nonferrous metal products inventories is inverted.

U.S. Geological Survey, March 2011

Table 2.
The Primary Metals Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2010				
March	146.9	16.7	94.8	18.1
April	148.7	16.3	95.8	18.4
May	147.8	11.9	96.6	17.6
June	146.0	6.9	96.5	14.2
July	144.8	3.3	96.1	10.4
August	146.1	3.6	96.0r	8.1r
September	148.0	4.9	96.7	7.6
October	150.0r	6.2r	96.3r	4.9r
November	153.5	9.5r	98.3	7.4r
December	156.4r	12.1r	100.7r	10.6r
2011				
January	156.3r	10.5r	101.0	9.8
February	158.7	12.2	NA	NA

NA: Not available **r:** Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 3.
The Contribution of Each Primary Metals Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**January**	**February**
1. Average weekly hours, primary metals (NAICS 331)	-0.3r	0.6
2. Weighted S&P stock price index, machinery, construction and farm and industrial (December 30, 1994 = 100)	0.2r	0.5
3. Ratio of price to unit labor cost (NAICS 331)	0.1	NA
4. USGS metals price index growth rate	0.2r	0.2
5. New orders, primary metal products, (NAICS 331 & 335929) 1982$	0.1	NA
6. Index of new private housing units authorized by permit	-0.5	NA
7. Growth rate of U.S. M2 money supply, 2005$	-0.2	NA
8. PMI	0.3r	0.1
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	1.6r	0.4

Coincident Index	**December**	**January**
1. Industrial production index, primary metals (NAICS 331)	0.9r	-0.2
2. Total employee hours, primary metals (NAICS 331)	0.6r	0.0
3. Value of shipments, primary metals products, (NAICS 331 & 335929) 1982$	0.8r	0.4
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	2.4r	0.3

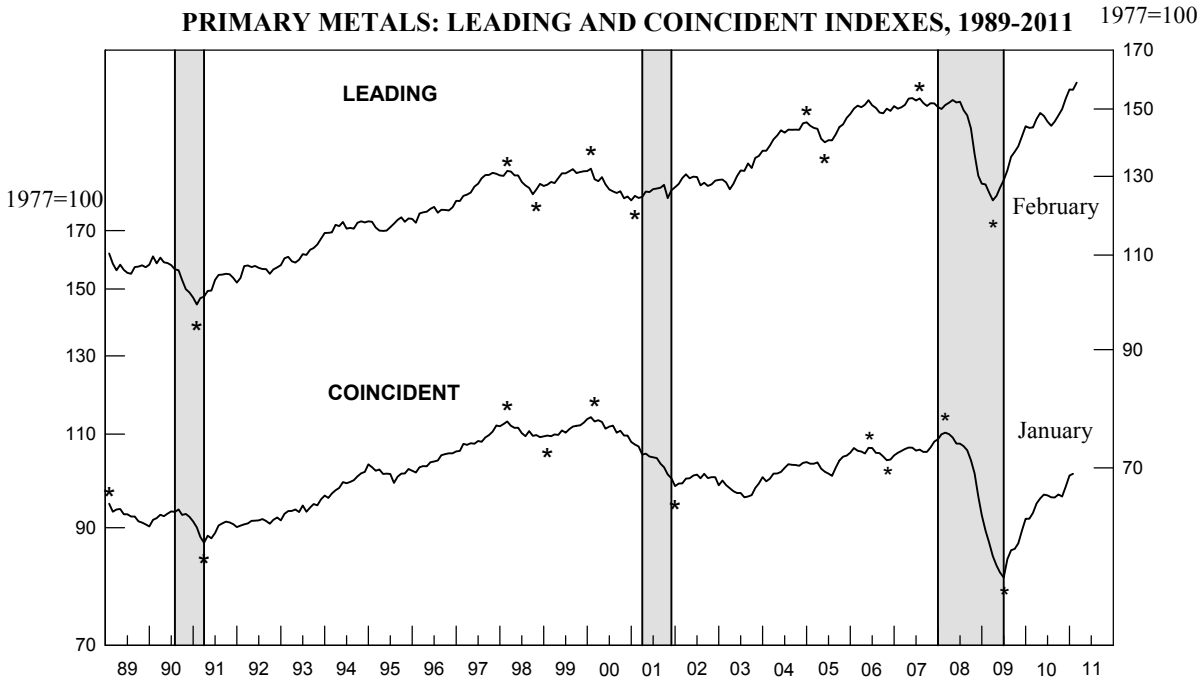
Sources: Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's and U.S. Geological Survey; 3, U.S. Geological Survey; 4, Journal of Commerce and U.S. Geological Survey; 5, U.S. Census Bureau and U.S. Geological Survey; 6, U.S. Census Bureau and U.S. Geological Survey; 7, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 8, Institute for Supply Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey; 3, U.S. Census Bureau and U.S. Geological Survey. All series are seasonally adjusted, except 2, 3, and 4 of the leading index.

NA: Not available **r:** Revised

Note: A component's contribution, shown in Tables 3, 5, 7, and 9, measures its effect, in percentage points, on the percent change in the index. Each month, the sum of the contributions plus the trend adjustment equals (except for rounding differences) the index's percent change from the previous month.

CHART 2.

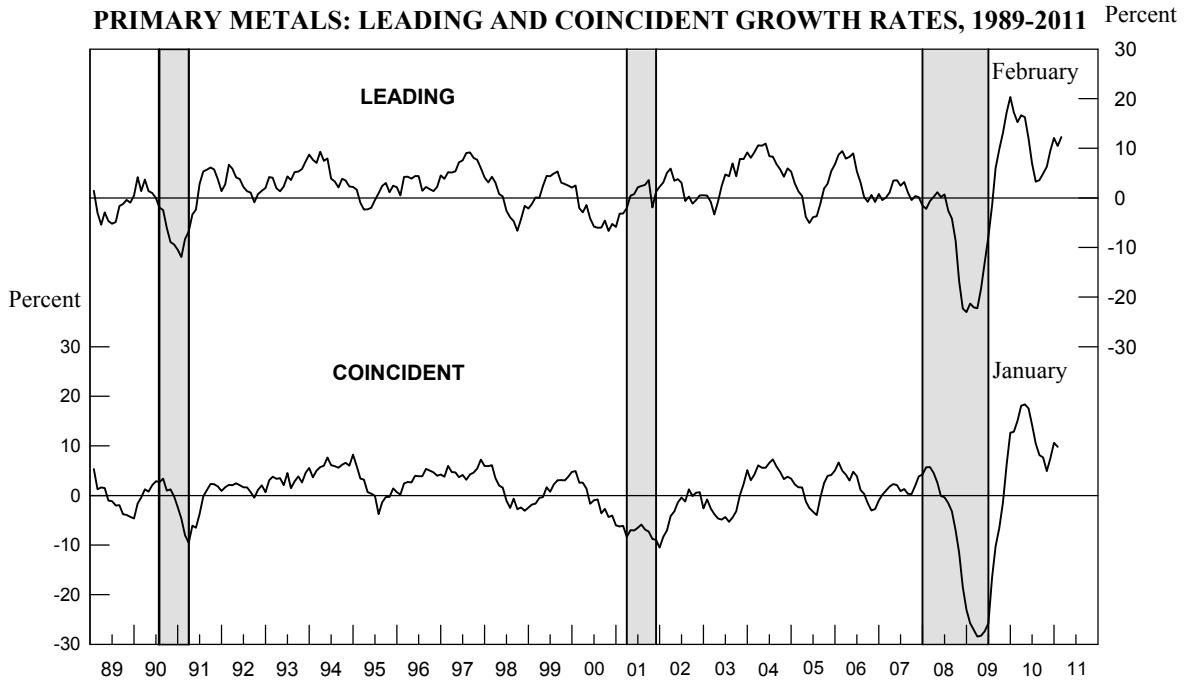
PRIMARY METALS: LEADING AND COINCIDENT INDEXES, 1989-2011



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 3.

PRIMARY METALS: LEADING AND COINCIDENT GROWTH RATES, 1989-2011



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, March 2011

Table 4.
The Steel Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2010				
February	108.0	8.1	96.2	16.6
March	110.8	12.2	98.0	18.8
April	111.6	12.0	98.1	16.9
May	110.7	8.5	99.2	16.3
June	107.6	1.7	97.8	10.5
July	106.0	-1.7	96.0	4.3
August	106.4	-1.5	96.4	3.5
September	107.5	0.1	97.3r	3.9r
October	109.0	2.0r	97.0	1.7
November	112.0	6.6	100.4	7.3r
December	113.3r	8.0r	102.7r	10.7r
2011				
January	112.9	6.3	102.6	9.0

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

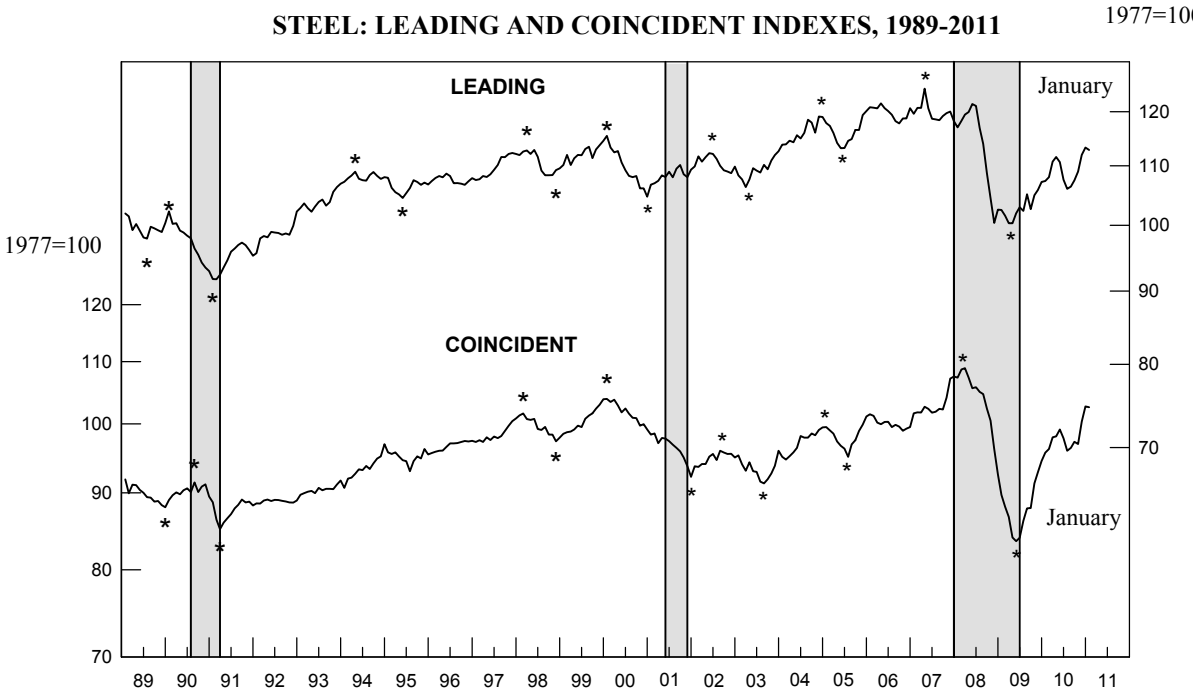
Table 5.
The Contribution of Each Steel Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**December**	**January**
1. Average weekly hours, iron and steel mills (NAICS 3311 & 3312)	0.3r	-0.8
2. New orders, iron and steel mills (NAICS 3311 & 3312), 1982$	-0.5r	0.0
3. Shipments of household appliances, 1982$	-0.2	0.1
4. S&P stock price index, steel companies	0.6	0.3
5. Retail sales of U.S. passenger cars and light trucks (units)	0.1	0.1
6. Growth rate of the price of steel scrap (#1 heavy melting, $/ton)	0.2	0.4
7. Index of new private housing units authorized by permit	0.7	-0.5
8. Growth rate of U.S. M2 money supply, 2005$	-0.1	-0.2
9. PMI	0.0	0.2
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	1.1r	-0.4
Coincident Index		
1. Industrial production index, iron and steel products (NAICS 3311 & 3312)	1.0r	-0.3
2. Value of shipments, iron and steel mills (NAICS 3311 & 3312), 1982$	0.6r	0.4
3. Total employee hours, iron and steel mills (NAICS 3311 & 3312)	0.6r	-0.3
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	2.3r	-0.1

Sources: Leading: 1, Bureau of Labor Statistics; 2, U.S. Census Bureau and U.S. Geological Survey; 3, U.S. Census Bureau and U.S. Geological Survey; 4, Standard & Poor's; 5, U.S. Bureau of Economic Analysis and American Automobile Manufacturers Association; 6, Journal of Commerce and U.S. Geological Survey; 7, U.S. Census Bureau and U.S. Geological Survey; 8, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 9, Institute for Supply Management. Coincident: 1, Federal Reserve Board; 2, U.S. Census Bureau and U.S. Geological Survey; 3, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted, except 4 and 6 of the leading index.

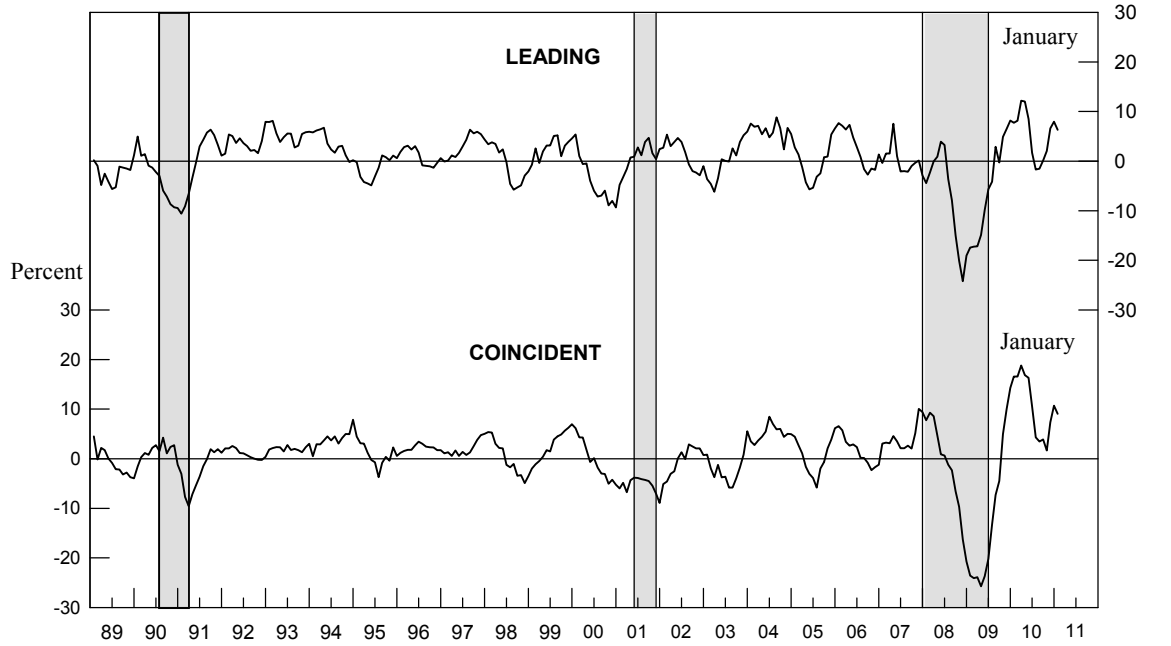
r: Revised

CHART 4.
STEEL: LEADING AND COINCIDENT INDEXES, 1989-2011



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 5.
STEEL: LEADING AND COINCIDENT GROWTH RATES, 1989-2011



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, March 2011

Table 6.
The Copper Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2010				
February	121.0	11.7	90.1	2.1
March	124.0	14.5	93.8	10.3
April	124.0	11.8	94.4	10.9
May	121.7	5.7	93.0	6.8
June	119.4	0.3	95.1	9.7
July	118.6	-2.1	96.3	10.1
August	119.1	-2.0	98.0	11.8
September	118.6r	-3.0r	95.1	4.3
October	120.3	-0.5	97.0r	7.2r
November	119.8r	-1.8r	98.1r	8.0r
December	122.5r	2.5r	97.1r	5.2r
2011				
January	121.1	0.5	96.6	3.4

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

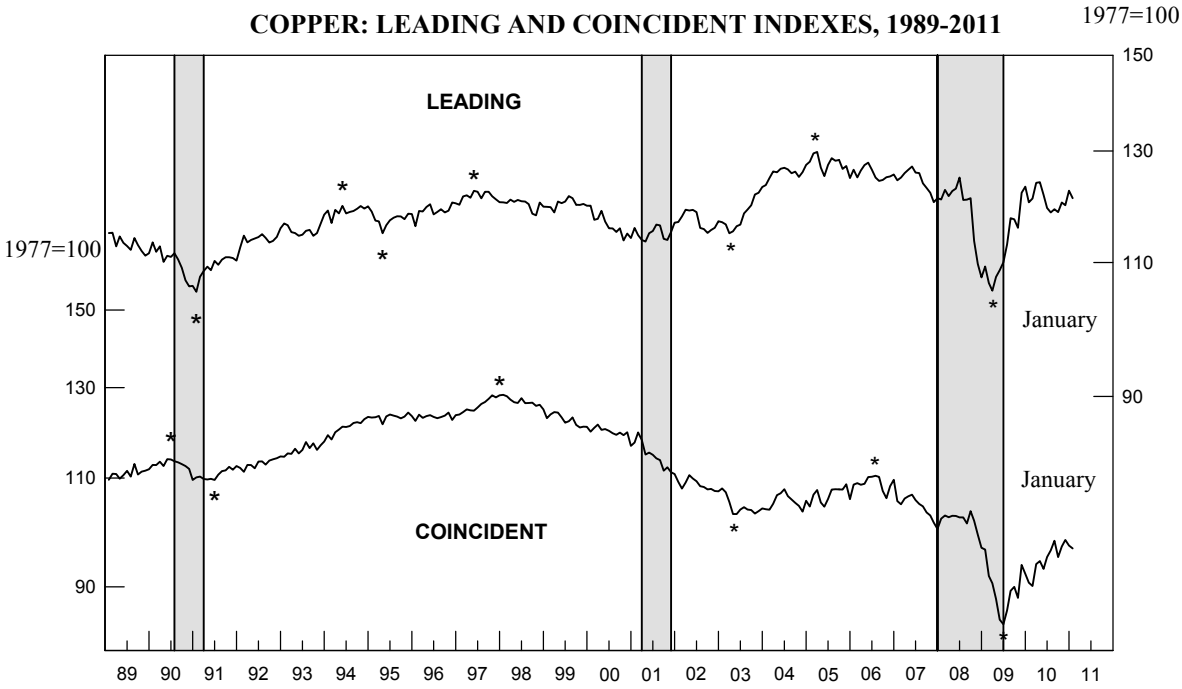
Table 7.
The Contribution of Each Copper Index Component to the Percent Change in the Index from the Previous Month

	December	January
Leading Index		
1. Average weekly hours, nonferrous metals except aluminum (NAICS 3314)	-1.1r	-0.9
2. New orders, nonferrous metal products, (NAICS 3313, 3314, & 335929) 1982$	0.3r	-0.1
3. S&P stock price index, building products companies	1.0	0.4
4. LME spot price of primary copper	0.7	0.1
5. Index of new private housing units authorized by permit	0.9	-0.7
6. Spread between the U.S. 10-year Treasury Note and the federal funds rate	0.4	0.1
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	2.2r	-1.1
Coincident Index		
1. Industrial production index, primary smelting and refining of copper (NAICS 331411)	0.1r	0.0
2. Total employee hours, nonferrous metals except aluminum (NAICS 3314)	-1.2r	-0.6
3. Copper refiners' shipments (short tons)	NA	NA
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-1.0r	-0.5

Sources: Leading: 1, Bureau of Labor Statistics; 2, U.S. Census Bureau and U.S. Geological Survey; 3, Standard & Poor's; 4, London Metal Exchange; 5, U.S. Census Bureau and U.S. Geological Survey; 6, Federal Reserve Board and U.S. Geological Survey. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics; 3, American Bureau of Metal Statistics, Inc. and U.S. Geological Survey. All series are seasonally adjusted, except 3, 4, and 6 of the leading index.

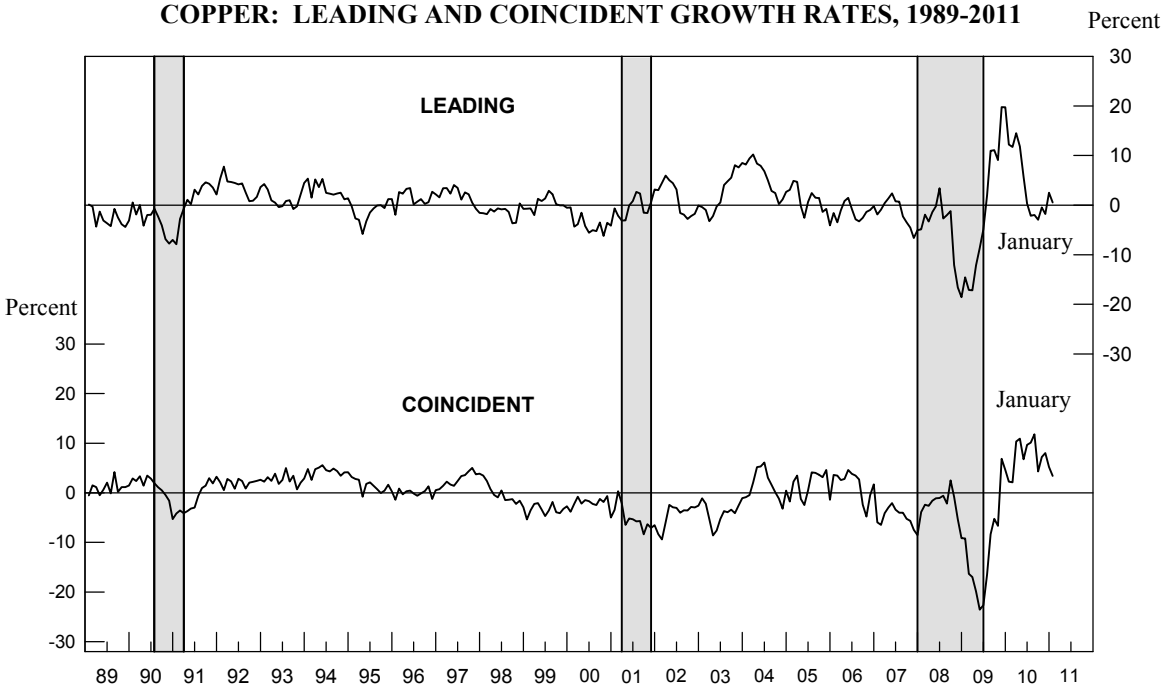
r: Revised NA: Not available

CHART 6.
COPPER: LEADING AND COINCIDENT INDEXES, 1989-2011



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 7.
COPPER: LEADING AND COINCIDENT GROWTH RATES, 1989-2011



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, March 2011

Explanation

Each month, the U.S. Geological Survey tracks the effects of the business cycle on five U.S. metal industries by calculating and publishing composite indexes of leading and coincident indicators. Wesley Mitchell and Arthur Burns originated the cyclical-indicators approach for the economy as a whole at the National Bureau of Economic Research in the mid-1930s. Over subsequent decades this approach was developed and refined, mostly at the National Bureau, under the leadership of Geoffrey H. Moore.[1]

A business cycle can briefly be described as growth in the level of economic activity followed by a decline succeeded by further growth. These alternating periods of growth and decline do not occur at regular intervals. Composite indexes, however, can help determine when highs and lows in the cycle might occur. A composite index combines cyclical indicators of diverse economic activity into one index, giving decision makers and economists a single measure of how changes in the business cycle are affecting economic activity.

The indicators in the metal industry leading indexes historically give signals several months in advance of major changes in a coincident index, a measure of current metal industry activity. Indicators that make up the leading indexes are, for the most part, measures of anticipations or new commitments to various economic activities that can affect the metal industries in the months ahead.

Composite coincident indexes for the metal industries consist of indicators for production, shipments, and total employee hours worked. As such, the coincident indexes can be regarded as measures of the economic health of the metal industries.

The metal industry coincident indexes reflect industry activity classified by the U.S. Standard Industrial Classification (SIC) and the North American Industry Classification System (NAICS). Of the five metal industries, primary metals (NAICS 331) is the broadest, containing 25 different metal processing industries. Steel, aluminum, and copper are specific industries within the primary metals group.

The SIC was the main vehicle used by the U.S. Government and others in reporting industry economic statistics throughout most of the last century. Starting with the 1997 U.S. Economic Census, the U.S. Government began using the NAICS, which classifies economic data for industries in Canada, Mexico, and the United States. In general, metal industry indexes starting in 1997 begin to reflect the NAICS classification, while indexes for earlier years follow the SIC. Hence, composite indexes from 1997 forward are not entirely consistent with those of earlier years.

The largest change to primary metals because of the NAICS deals with other communication and energy wire manufacturing (NAICS 335929). Under NAICS, this manufacturing has been removed from primary metals and added to electrical equipment, appliance, and component manufacturing. Because monthly shipments and new orders for this wire are not available, the USGS is estimating their values from 1997 onward and adding them to the appropriate metal industry indicators and indexes to maintain consistency.

[1]**Business Cycle Indicators, A monthly report from The Conference Board** (March 1996).

There are other small changes to the primary metals industry because of the switch to the NAICS. Coke oven activity not done by steel mills, for example, is removed and alumina refining, a part of industrial inorganic chemical manufacturing under the SIC, is added. Since the historic trends of the composite indexes are not affected by these small changes, the USGS is not making specific adjustments to the indexes for them for the periods before and after 1997.

The metal industry leading indexes turn before their respective coincident indexes an average of 8 months for primary metals and 7 months for steel and copper. The average lead time for the primary aluminum leading index is 6 to 8 months, and the average lead time for the aluminum mill products leading index is 6 months.

The leading index of metal prices, also published in the *Metal Industry Indicators*, is designed to signal changes in a composite index of prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange. On average, this leading index indicates significant changes in price growth about 8 months in advance.

The growth rate used in the *Metal Industry Indicators* is a 6-month smoothed growth rate at a compound annual rate, calculated from a moving average. Moving averages smooth fluctuations in data over time so that trends can be observed. The 6-month smoothed growth rate is based upon the ratio of the latest monthly value to the preceding 12-month moving average.

$$\left[\left(\frac{\text{current value}}{\text{preceding 12-month moving average}}\right)^{\frac{12}{6.5}} - 1.0\right] * 100$$

Because the interval between midpoints of the current month and the preceding 12 months is 6.5 months, the ratio is raised to the 12/6.5 power to derive a compound annual rate.

The growth rates measure the near-term industry trends. They, along with other information about the metal industries and the world economy, are the main tools used to determine the outlook of the industries. A 6-month smoothed growth rate above +1.0% usually means increasing growth; a rate below –1.0% usually means declining growth.

The next update for these indexes is scheduled for release on the World Wide Web at 10:00 a.m. EDT, Friday, April 15. The address for *Metal Industry Indicators* on the World Wide Web is: http://minerals.usgs.gov/minerals/pubs/mii/

The ***Metal Industry Indicators*** is produced at the U.S. Geological Survey by the National Minerals Information Center. The report is prepared by Gail James (703-648-4915; e-mail: gjames@usgs.gov) and Ken Beckman (703-648-4916; e-mail: kbeckman@usgs.gov). The former Center for International Business Cycle Research, under the direction of Dr. Geoffrey H. Moore, and the former U.S. Bureau of Mines developed the metal industry leading and coincident indexes in the early 1990s. Customers can send mail concerning the *Metal Industry Indicators* to the following address:

U.S. Geological Survey
National Minerals Information Center
988 National Center
Reston, Virginia 20192